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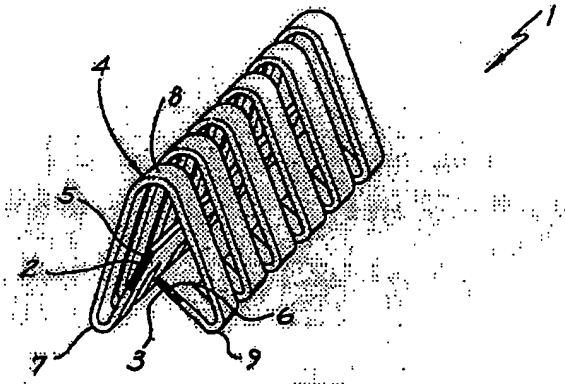

(57) Abstract

A flexible electrically conductive track including an elongated flexible insulating member (150) providing at least one longitudinally extending slot (159) to receive an electric conductor (158). The conductor (158) includes a pair of generally parallel co-extensive contact strips (165) joined by a plurality of transverse ribs (166). The slots (159) are closed by resiliently displaceable flanges (161) which are displaced to provide access to the conductor (158).

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FLEXIBLE ELECTRICAL CONDUCTOR

Background Of Invention

The present invention relates to electricity supply apparatuses and more particularly relates to an electrical conductor for use with such apparatuses particularly flexible conductive tracks for use in walls, floors, skirting boards or ceilings.

Prior Art

In the past, flexible electric conductors have been known for use with electrical distribution systems and in particular, flexible conductive tracks.

One such conductor was disclosed in international application PCT/AU92/00414 wherein there is disclosed an insulating housing able to travel around curves and corners without the need to provide corner junctions or adaptors.

The known electrical distribution systems including flexible conductive tracks include a plurality of longitudinally extending recesses which close when the flexible conductive track is bent.

The flexible conductor disclosed in the above PCT application comprises solid copper wire supporting a conductive blade which has a series of cut outs along its length. It was found that this track did not perform to expectation in that it was not wholly conducive to bending and in fact sometimes resulted in damage to the conductive elements. An alternative electrical conductor for use in a flexible conductive track was disclosed in a subsequent application by the same applicant as that for the above PCT international application. That application serial No. 24215/92 disclosed an elongate flexible conductor assembly located in a longitudinally extending slot in a housing for use in an electrical bus distributor. The conductor disclosed in that specification comprised a coiled hollow conductor located in slots provided in the elongate flexible insulated housing. In order to effect engagement between the conductor and the electrical plug, pins on the plug were adapted with connector sockets formed by a bifurcated member which upon engagement with the continuous conducting element spread apart and engaged the conductor on either side. In use, it is predictable that the electrical contact between the connector sockets and the conductor will sometimes be compromised as the sockets after continued use begin to loose their elastic memory upon which reliance was placed to effect proper electrical connection.

A flexible electrically conductive track is discussed in Australian Patent 655069. The elongated flexible electric conductor consists of a length of conductive wire over which there is placed prongs or arms. A plug having one or more tines engages the conductor by having its tine located between the lugs or arms. A cover strip is employed to enclose the conductor, however it has to be removed to provide access to the conductor thereby making the strip prone to be lost.

The above discussed electric conductor has the disadvantage that it is made of several components requiring assembly. This adds to the cost of manufacture.

Still further, the conductor is located within insulating material which is then inserted in an extrusion. The extrusion provides a cavity for the conductor and insulating material and provides a slot through which a plug is inserted to engage the conductor.

A disadvantage of the above discussed arrangement is that dust and water can enter the extrusion.

Summary of the Invention

There is disclosed herein an elongated flexible electric conductor of unitary construction, said conductor comprising:

two longitudinally extending edge strips which are transversely opposed so that a gap is defined therebetween; and

a plurality of transverse rib elements extending between the strips, the elements being located at space locations along the conductor so that the elements are spaced, with the elements being resiliently deformable so that the strips are urged toward each other.

There is further disclosed herein an electric duct assembly comprising:

an elongated housing generally enclosing a longitudinally extending hollow and having a longitudinally extending slot to provide access to the hollow;

an elongated insulated electrical conductor mounted within the hollow and adapted to be engaged at a selected position along the housing by an electrical connector to receive electric power from the conductor; and

displaceable cover means captively mounted with respect to the housing and closing said slot but displaceable therefrom to provide access to said connector.

There is still further disclosed herein an elongated insulating member for an electric conductor, said insulating member having longitudinally extending slot to receive the conductor, and at least resiliently deformable flange closing the slot but being displaceable to provide access to the conductor.

Brief Description of the Drawings

Preferred forms of the present invention will now be described by way of example with reference to the accompanying drawings wherein:

Figure 1: shows a perspective view of a continuous conductor according to a preferred embodiment of the invention;

Figure 2: shows a cross sectional view of the continuous conductor of Figure 1 embedded in an insulating housing;

Figure 3: shows the conductor of Figure 2 with a pin of an electrical plus inserted therein;

Figure 4: shows another cross sectional view of the continuous conductor wherein a portion only of the conductor is embedded in an insulating housing;

Figure 5: shows a cross sectional view of a conductor having an alternative configuration embedded in an insulating housing;

Figure 6: shows a cross section of a flexible electrical duct showing typical engagement between the pin of an electrical plug and a continuous conductor according to one embodiment of the invention;

Figure 7: shows a plan view of a continuous flexible conductor showing a series of ribs according to a preferred embodiment;

Figure 8: shows a cross sectional view of a flexible conductor according to an alternative embodiment of the invention;

Figures 9a, 9b: show the ribs of a typical spine of the flexible electrical conductor of Figure 8 in the folded and unfolded configurations;

Figure 10 is a schematic perspective view of an electric duct;

Figure 11 is a schematic part sectioned end elevation of the duct of Figure 8;

Figure 12 is a schematic perspective view of a length of insulating material employed in the duct of Figure 10;

Figure 13 is a schematic side elevation of a connector which may be used with the duct of Figure 10;

Figure 14 is a schematic perspective view of an elongated flexible electric conductor and a surrounding insulation;

Figure 15 is a schematic sectioned end elevation of the conductor and insulating material of Figure 12;

Figure 16 is a schematic perspective view of a cover strip employed in the duct of Figure 10;

Figure 17 is a schematic end elevation of the cover of Figure 16;

Figure 18 is a schematic end elevation of a duct housing adapted to receive the conductor and insulating material of Figure 14;

Figure 19 is a schematic end elevation of the duct of Figure 18;

Figure 20 is a schematic perspective view of the duct of Figure 18;

Figure 21 is a schematic perspective view of the conductor of Figure 14;

Figure 22 is a schematic end elevation of the conductor of Figure 21;

Figure 23 is a schematic side elevation of the conductor of Figure 21;

Figure 24 is a schematic end elevation of a further insulating member;

Figure 25 is a schematic end elevation of the insulating member of Figure 24, inserted in an elongated supporting housing;

Figure 26 is a schematic end elevation of an electric conductor employed in Figure 25; and

Figure 27 is a schematic perspective view of a further electric conductor.

Referring to Figure 1 there is shown a conducting element 1 according to a preferred embodiment of the invention. In this embodiment the conductor has two spines however, it will be appreciated that the conductor can be formed from one spine wherein the ribs each have a free end. Element 1 comprises continuous spines 2 and 3 to which attached to

secondary conductive ribs 4. Preferably, the secondary conductive rib 4 are each integral with spines 2 and 3. Each rib 4 has fixed ends 5 and 6 terminating at spines 2 and 3 respectively and include first, second and third bends 7, 8 and 9. By introducing the bends, end 5 terminates close to end 6 of rib 4 thereby forming a set of jaws which receive a pin (see Figure 3) from an electric plug. The jaws displace when the pin is inserted therebetween ensuring that ends 5 and 6 are urged into continuous electrical contact with the pin.

Referring to Figure 2 there is shown a cross sectional view of the continuous electrical conductor of Figure 1 embedded in a plastics housing 10. Conductor 1 comprises a series of ribs integral with spines 2 and 3. In Figure 2 typical rib 4 comprises copper. Rib 4 is configured according to this embodiment by cold bending such that a series of bends 7, 8 and 9 are introduced so that end 5 locates close to end 6 thereby forming the jaws within which pin 19 (see Figure 3) penetrates to establish an electrical connection. Housing 10 comprises outer casing 14 and inner core 15. Outer casing 14 is formed from a flexible but firm plastics material, whereas inner core 15 comprises a softer and more flexible plastics material. According to this embodiment, rib 4 is almost completely embedded in inner core 15 save for ends 5 and 6 which must be outside the housing 10 to enable electrical contact between pin 19 inserted therein (see Figure 3) and ends 5 and 6. Housing 10 includes a passage 16 into which pin 19 penetrates to establish electrical contact with ends 5 and 6.

Figure 2 shows the configuration of the rib 4 and contour of inner core 15 prior to insertion of the pin 19 to establish electrical contact. Before insertion of the pin, ends 5 and 6 are almost perpendicular to each other, and are maintained in that attitude by protrusions 17 and 18 of inner core 15. Although protrusions 17 and 18 provide some resistance for ends 5 and 6, ends 5 and 6 rely primarily on the resilience in the flexible copper material to be restored to the rest configuration when pin 19 is released. When the pin is inserted then released, the elastic memory in the copper conductor performs a crucial role in preserving the integrity of the electrical contact. The movement of the copper is so minimal when the pin is inserted that it retains its elastic memory.

Referring to Figure 3 there is shown a cross sectional view of a the conductive rib 4 of Figure 2 this time with pin 19 of an electrical plug inserted therein. Conductive rib 4 is shown embedded in insulated housing 10 as described for Figure 2. When pin 19 is inserted between ends 5 and 6, ends 5 and 6 are urged against pin 19 due to the natural bias towards the pin created by bends 20 and 21, and/or upper apex respectively thereby ensuring continuous electrical contact between pin 19 and ends 5 and 6 respectively.

Referring to Figure 4 there is shown the rib 4, this time only partially inserted in an alternative housing 22. According to this embodiment housing 22 does not include an inner core analogous to inner core 15 shown in Figures 2 and 3. Rather, rib 4 is disposed in clear passage 23 with only bend 8 embedded in the plastics material of housing 22. According to this embodiment the integrity of the electrical connection between ends 5 and 6 is reliant on the elastic memory in the copper and hence the resilience of the copper material.

Referring to Figure 5 there is shown an alterative configuration of rib and housing. According to this embodiment, housing 24 includes rib 25 which includes a substantially circular body 26 which terminates at spines 27 and 28. As with the rib 4 in Figure 4, rib 25 is only partially embedded in housing 24 via sector 29. Electrical connection between a pin (not shown) and spines 27 and 28 is effected in a similar manner as that described with reference to Figure 3. The grooves 27a (see Figure 7) must end before returns 26a and 26b of body 26 otherwise flexibility of the continuous conductor will be compromised. Similarly for the ribs of Figures 1 - 4. The grooves extend around and past the returns 26a and b, if not flexibility will be compromised.

Figure 6 shows a cross sectional view of a typical flexible skirting duct assembly 30 incorporating continuous electrical conductors 31 and 32. Typically, dust housing 33 is mounted on a wall surface where power is required. Housing 33 includes plastic housing 34 which receives and supports conductors 31 and 32. The arrangement shown in Figure 6 incorporates the conductor and housing arrangement of Figure 5 previously described. When electrical contact is to be made between the electrical plug 35 and continuous conductors 31 and 32 plug 35 is advanced towards opening 36 so that pins 37 and 38 are able to penetrate the opening. This can only be achieved when plug 35 is rotated so that pins 37 and 38 are parallel to the longitudinal axis of opening 36. When the plug is inserted and once pins 37 and 38 are in alignment with openings 39 and 40 respectively, plug 35 is then rotated to enable pins 37 and 38 to engage conductors 31 and 32 according to the manner previously described.

Conductors 31 and 32 are configured so as to allow bending where the duct, for instance, is required to travel around corners and curved surfaces and also to enable tight interfitting between pins 37 and 38 and the conductors thereby ensuring the integrity of the electrical connection.

Due to the separation between the conducting ribs, the duct in which the electrical conductor is located is able to be freely bent without risking breaking electrical contact between pin and the jaws of each rib. In the circumstance where heat is induced in the connection electrical contact is not dependent upon the insulating material of the housing to ensure electrical connection between the jaws. If the electrical connection relies on the integrity of the insulating material for contact and heat affects the insulating material electrical contact can very often be affected. According to the present invention the jaws of the conducting elements are sufficiently biased towards the pin 19 to ensure that electrical contact is independent of the integrity of the insulating material.

Figure 7 shows a plan view of a flexible electrical conductor 45 according to a preferred embodiment. Conductor 45 includes a series of spaced apart ribs 46 which are integral with spines 47 and 48.

According to an alternative embodiment of the invention there is provided a flexible electrical conductor comprising a rib and spine arrangement manufactured from a non-conductive material wherein the spine is contoured to receive a conductive element such as a

copper wire or strip as a transporter of electrical current. Preferably, the non-conductive material is phosphorous bronze which has sufficient flexibility and durability. Thus, the manufacture of the spine and rib arrangement from a flexible material satisfies the flexibility requirement but may not satisfy the conductivity requirements. The latter is provided by the introduction of the copper strip or wire. The electric plug which is inserted into the spine makes contact with the copper wire to effect electrical connection. This arrangement can result in both reduced material costs and electrical resistance.

Referring to Figure 8 there is shown a cross sectional view of a flexible conductor according to an alternative embodiment of the invention. The flexible conductor comprises a spine 50 comprising ribs 51 and 52 which may be of equal or unequal length and which terminate in free ends 53 and 54 respectively. In Figure 8 the ribs 51 and 52 are shown as having unequal length. One advantage of the ribs having unequal length is that the spines may pass each other when the flexible conductor is bent to travel around a corner (see Figures 9a and b below). The embodiment of spine 50 of Figure 8 is shown partially embedded in flexible PVC mould 55.

Referring to Figures 9a and b there is shown a typical spine 56 in isolation from the plastics mould. Figure 9a shows ribs 57 and 58 as they would normally be disposed. Figure 9b shows rib 57 urged substantially into alignment with rib 58. This occurs when the flexible conductor is bent around a corner and reduces the space taken by the ribs resulting in slimming at bends and corners. At the end of each of ribs 57 and 58 are copper conductors 59 and 60 which contact a conducting pin of an electrical plug inserted into the flexible conductor.

In Figure 10 there is schematically depicted an electric duct 110 which includes an elongated housing 111 consisting of two sections 112 and 113. The elongated sections 112 and 113 could be, for example, aluminium or plastics extrusions. The sections 111 and 112 cooperate to enclose a hollow within which there is located three elongated flexible electric conductors 114 located within an elongated flexible insulating member 115.

The sections 112 and 113 cooperate to define a slot 16 which is closed by a cover member 117.

In use of the above described duct 110, the duct 110 is used in conjunction with a plug or connector 118 (Figure 13) which includes three tines 119 each adapted to selectively engage a respective one of the conductors 114. The connector 118 has a base 120 which is inserted through the slot 116 whereafter the connector 118 is rotated bringing the tines 119 into contact with the conductors 114.

The cover member 117 for example may be formed of expanded foam material and may be transversely slotted or grooved.

When the connector 118 is inserted through the slot 116, the member 117 is resiliently deformed to provide access to the conductors 114. When the connector 118 is removed, the member 117 resumes its position closing the slot 116.

In Figure 11 there is schematically depicted an alternative extrusion 120 to receive three conductors 121 located within an elongated insulating member 122.

The extrusion 120 has a longitudinally extending end wall 123 from which there extends two longitudinally extending flanges 124 and 125. The flange 124 terminates with a longitudinally extending barb 126 while the flange 125 has a longitudinally extending barb 127.

The insulating member 122 has longitudinally extending ridges 128 and 129 which cooperate with the barbs 126 and 127 to retain the insulating member 122 and therefore the conductors 121 in position.

The end wall 123 is also provided with a longitudinally extending ridge 130 which extends into a longitudinally extending valley formed in the insulating member 122.

The conductors 121 and insulating member 122 are flexible.

As best seen in Figures 21 to 23, the conductors each include two longitudinally extending edge strips 131 joined by transverse elements 132, with the elements 132 being located at spaced locations along the conductor 121. The conductors 121 are basically formed of phosphorus bronze so as to be resilient while there is further provided copper strips 133 extending along the strips 131. The strips 131 provide longitudinally extending spines.

As best seen in Figure 22, the strips are spaced first in a first direction by the distance "A" and then by a second distance "B", which distances are perpendicular and transverse the longitudinal direction of extension of the conductor 121.

In Figures 14 and 15 there is schematically depicted an alternative configuration of the insulating member 132. In this particular embodiment the insulating member 132 has a central longitudinally extending slot 134 which would cooperate with a correspondingly shaped barb located on a wall of a surrounding extrusion.

For example, the insulating member 132 and conductors 121 as shown in Figures 14 and 15 may be incorporated in an extrusion 135 as shown in Figures 18 and 19. The extrusion 135 has a wall 136 from which there extends a barb 137 to engage within the slot 134. In this embodiment, the extrusion 135 has a pair of spaced end walls 138 and 139 between which there extends closure members 140 and 141. Both members 140 and 141 would be pivotally attached to an associated one of the walls 138 and 139 and would be movable to the position depicted in Figure 16 from the position depicted in Figure 19. A lip 142 would aid in retaining them in the position depicted in Figure 18. The closure members 140 and 141 would be provided in segments to permit a portion of the extrusion 135 to be exposed to provide access for a connector to engage the conductors 121. In this embodiment the extrusion 134 is adapted to be incorporated in a floor, such as a computer floor.

In Figure 24, there is schematically depicted an elongated insulating member 150. formed of flexible plastics material. Typically, the insulating member 150 would be extruded. The insulated member 150 is intended for inclusion in an elongated support 151 which may be an aluminium or plastics extrusion or similar type extrusion. The support 151 has an

"L-shape" flange 152 including a first flange portion 153 extending generally normal to the base 154. Depending from the portion 153 is a further portion 155. The portions 153 and 155 co-operate with the base 154 to define an elongated slot 156 within which the insulating member 150 is located and held. The base 154 has a longitudinally extending rib 157 which inhibits removal of the insulating member 150 from within the slot 156.

The insulating member 150 received three elongated conductors 158 (Figure 26). The insulating member 150 has three longitudinally extending slots 159 shaped to receive the conductors 158. The insulating member 150 also has a pair of displaceable legs 160 which are displaced toward each other when they are located within the slot 156. Each of the legs 160 has an end longitudinally extending flange 161 which closes off the associated slot 159. Similarly, the central slot 159 is closed off by a pair of longitudinally extending flanges 162.

The flanges 161 and 162 are displaceable when engaged by a plug so that the plug can engage the conductors 158.

The insulating member 150 also has a central slot 156 shaped to engage the longitudinally extending barb 164 of the support 151 to further aid in retaining the insulating member 150 in position within the slot 156.

Each conductor 158 is of an inverted "U-shape" configuration. Typically, the insulating member 158 would be of a similar construction to the insulating members of Figures 25 and 26 in that it would have a longitudinally extending contact portions 165 joining a plurality of ribs or legs 166. A further longitudinal join could be provided by means of a longitudinally extending spine 167.

The additional spine 167 is provided for extra current should it be required. Also, by being adjacent the apex 168 of each of the legs or ribs of 166, there is no reduction in flexibility of the conductor 158 about a transverse axis. In Figure 26, the conductor 158 has the longitudinally extending contact portions 165 generally parallel and co-extensive.

It will be recognised by persons skilled in the art that numerous variations and modifications can be made to the invention without departing from the overall spirit and scope of the invention as broadly described herein.

THE CLAIMS

1. An elongated flexible electric conductor of unitary construction, said conductor comprising:

two longitudinally extending edge strips which are transversely opposed so that a gap is defined thereberween; and

a plurality of transverse rib elements extending between the strips, the elements being located at space locations along the conductor so that the elements are spaced, with the elements being resiliently deformable so that the strips are urged toward each other.

2. The conductor of claim 1, wherein said ribbed elements are of a "U-shaped" and circular configuration with each rib element providing a pair of extremities, with the strips joining the extremities.

3. The conductor of claim 1 or 2, wherein the strips provide generally parallel contact surfaces.

4. An electric conductor assembly including a flexible elongated insulating member providing at least one longitudinally extending slot, and the conductor of claim 1, 2 or 3 located in said slot so that a plug member extending into said slot would be located between said strips so as to be in electrical contact therewith.

5. The assembly of claim 4, further including resilient deformable means closing the slot and which is displaced to provide access to the conductor.

6. An electric duct assembly comprising:

an elongated housing generally enclosing a longitudinally extending hollow and having a longitudinally extending slot to provide access to the hollow;

an elongated insulated electrical conductor mounted within the hollow and adapted to be engaged at a selected position along the housing by an electrical connector to receive electric power from the conductor; and

displaceable cover means captively mounted with respect to the housing and closing said slot but displaceable therefrom to provide access to said connector.

7. The assembly of claim 6, wherein said cover means is a resiliently deformable cover member mounted in the housing.

8. The assembly of claim 6, wherein said cover means is integrally formed in the insulating.

9. The assembly of claim 8, wherein the insulating is a longitudinally extending insulating member providing at least one resiliently deflectable flange providing the cover member.

10. An elongated insulating member for an electric conductor, said insulating member having longitudinally extending slot to receive the conductor, and at least resiliently deformable flange closing the slot but being displaceable to provide access to the conductor.

11. The member of claim 10, wherein each slot has a pair of associated resiliently deformable flanges which are displaceable to provide access to the conductor.

12. A flexible electric conductive track, substantially as hereinbefore described with reference to the accompanying drawings.

13. An electric conductor, substantially as hereinbefore described with reference to any one of the accompanying drawings.

14. An electric insulator, substantially as hereinbefore described with reference to any one of the accompanying drawings.

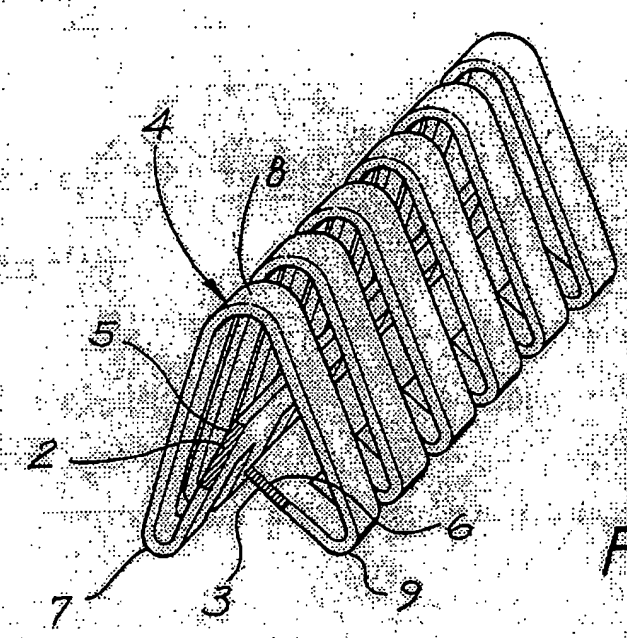

FIG. 1

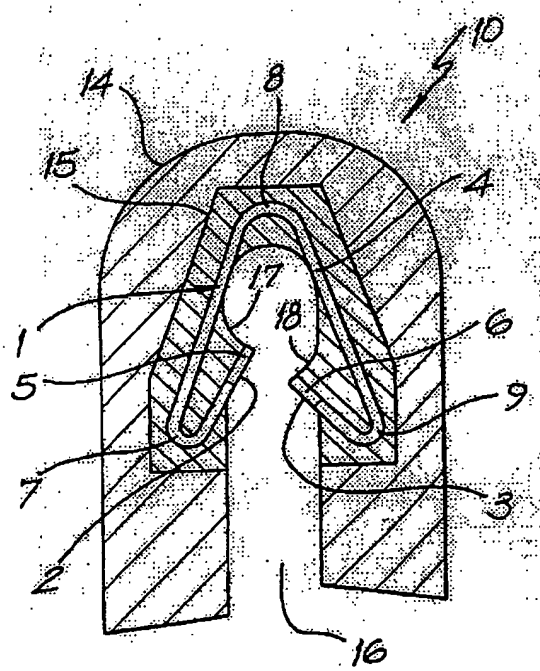

FIG. 2

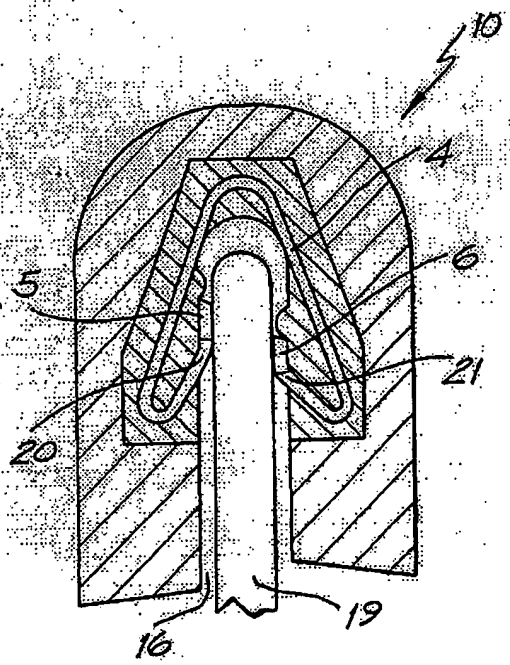

FIG. 3

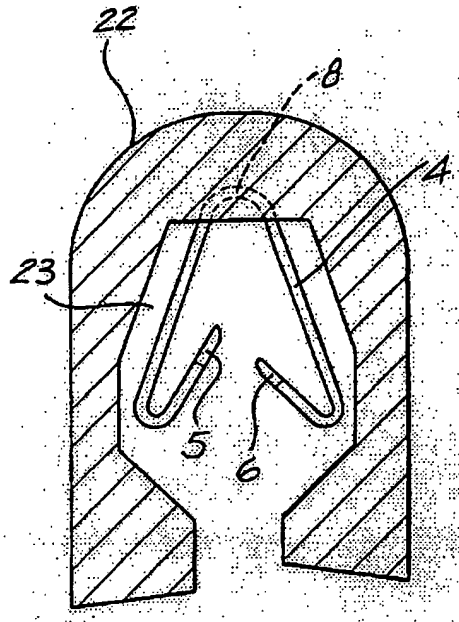

FIG. 4

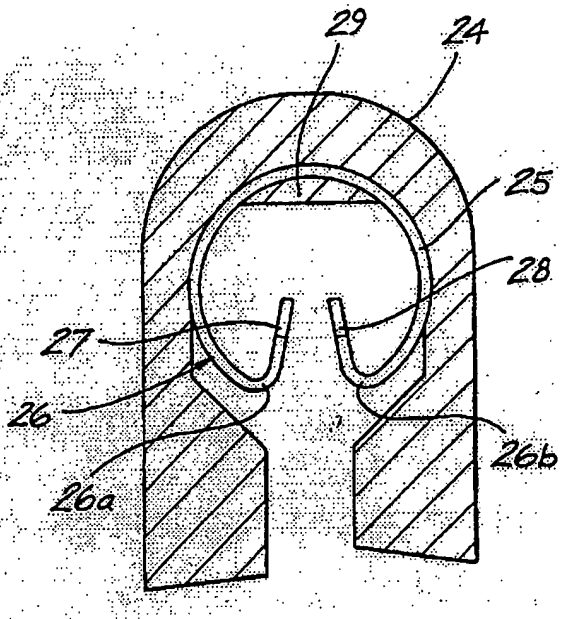

FIG. 5

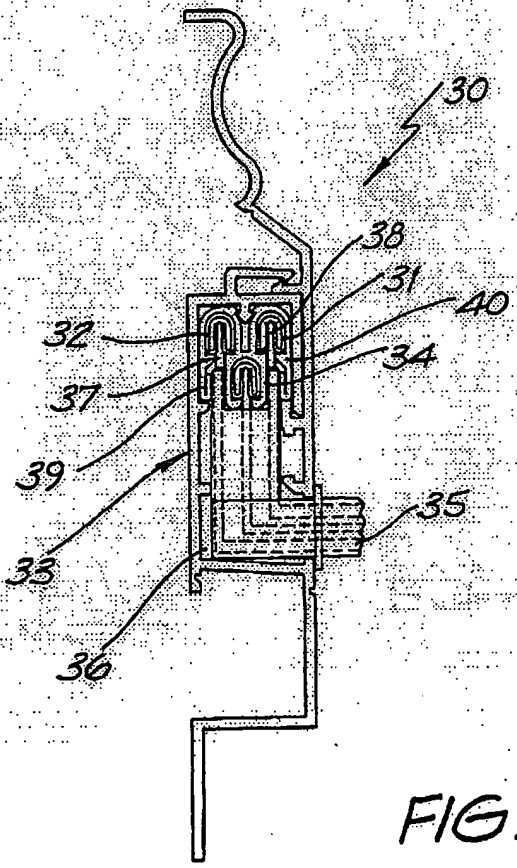

FIG. 6

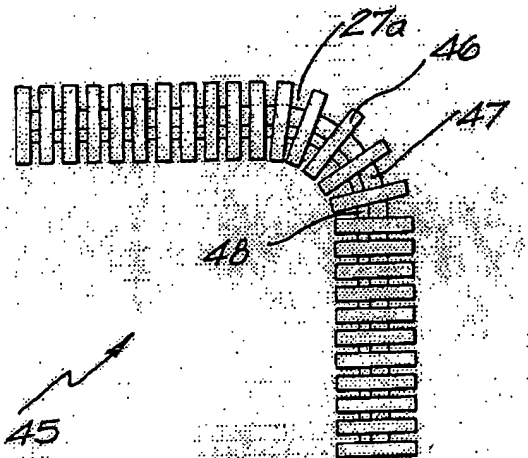

FIG. 7

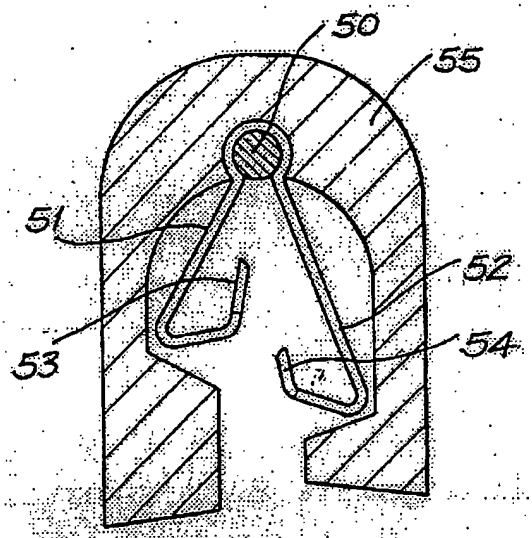

FIG. 8

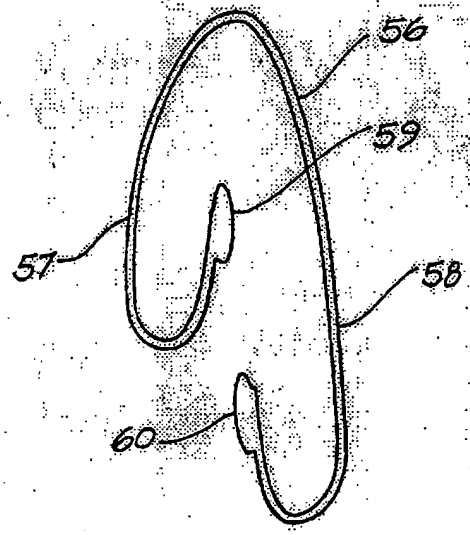

FIG. 9a

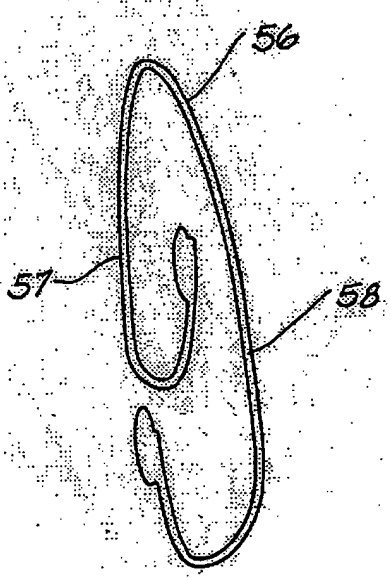

FIG. 9b

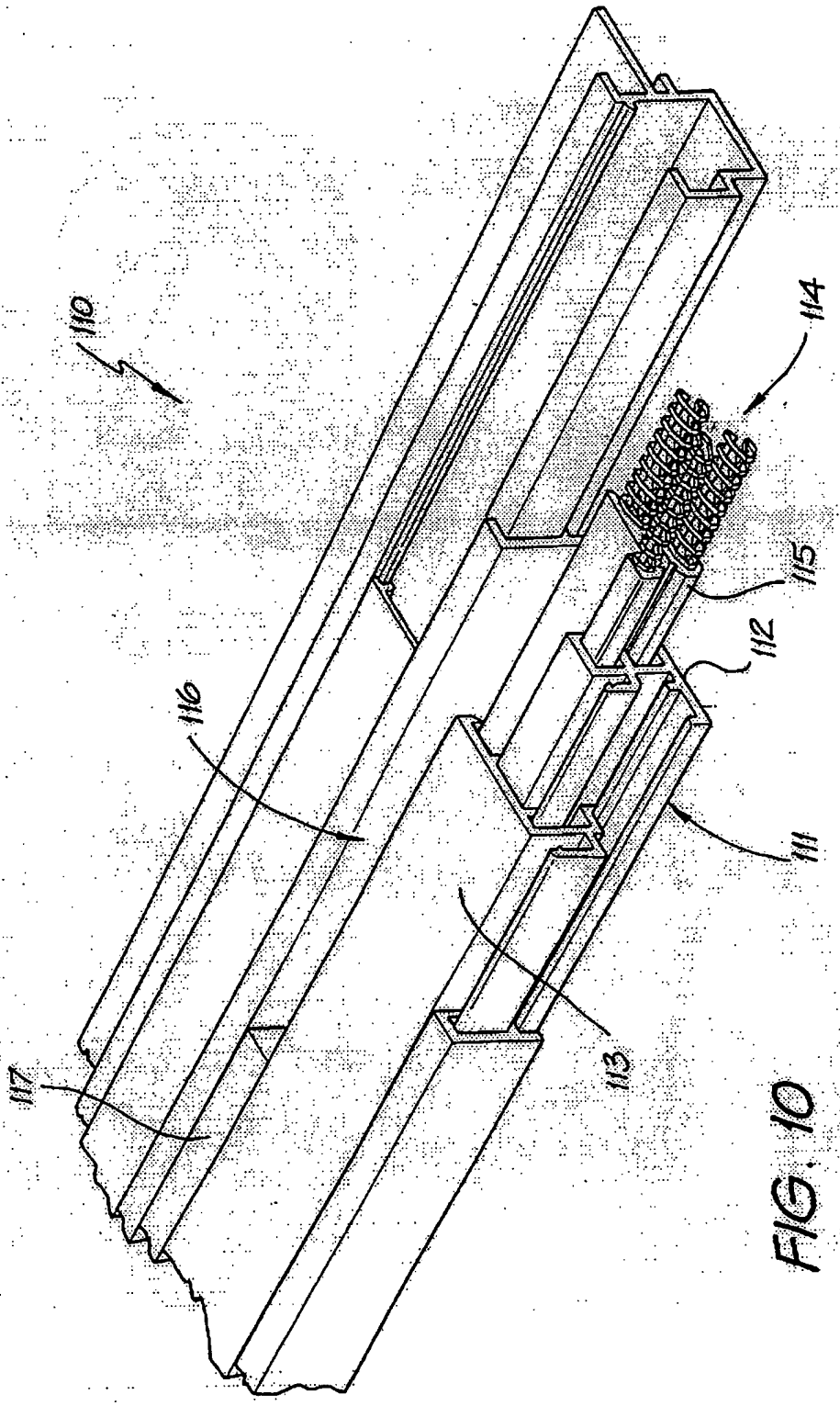

FIG. 10

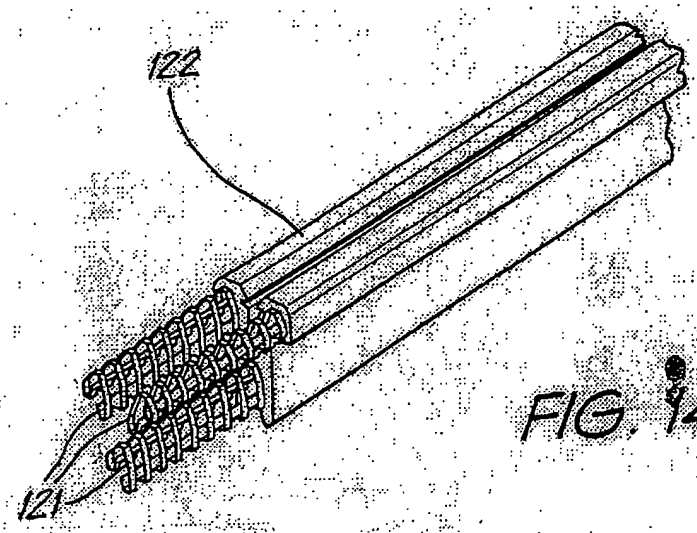

FIG. 14

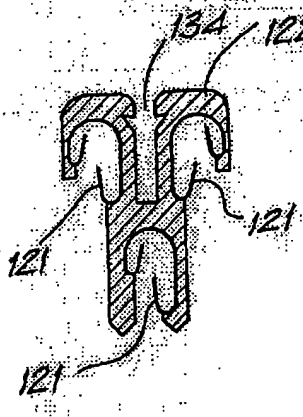

FIG. 15

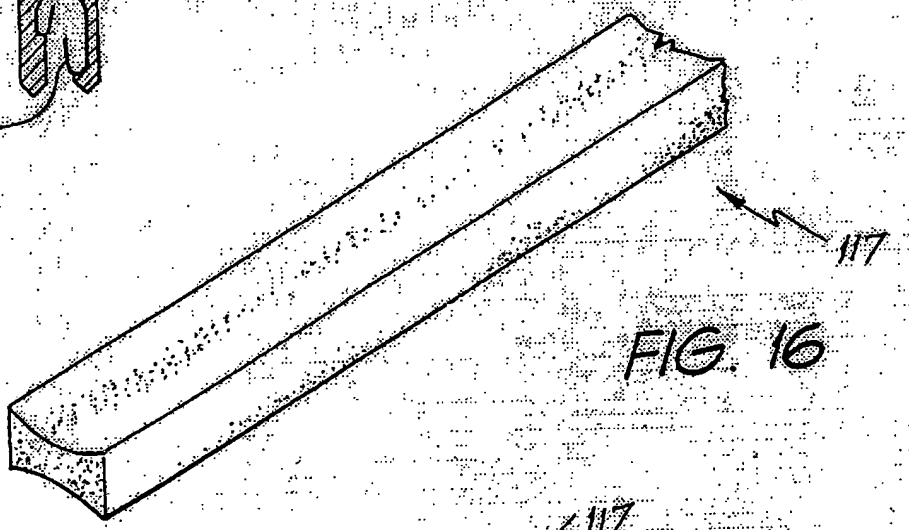

FIG. 16

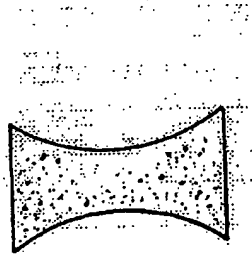

FIG. 17

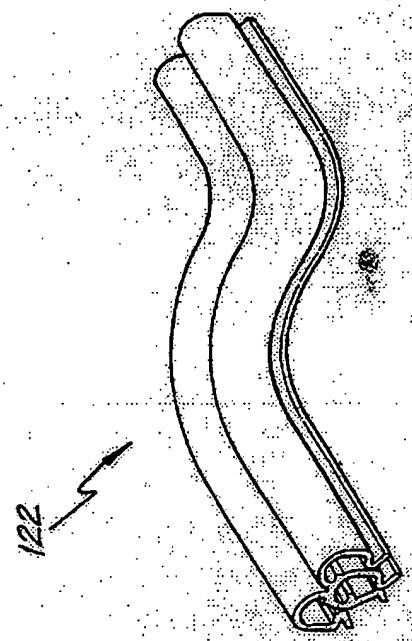

FIG. 12

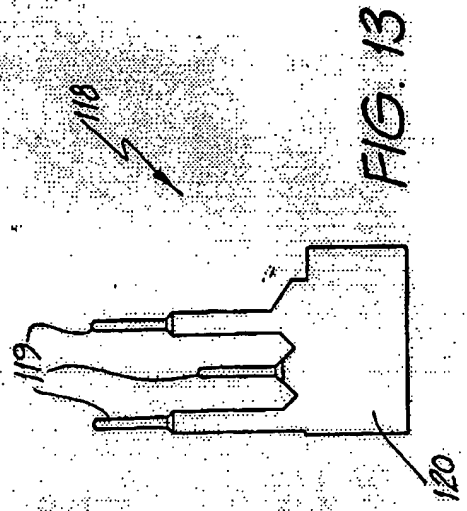

FIG. 13

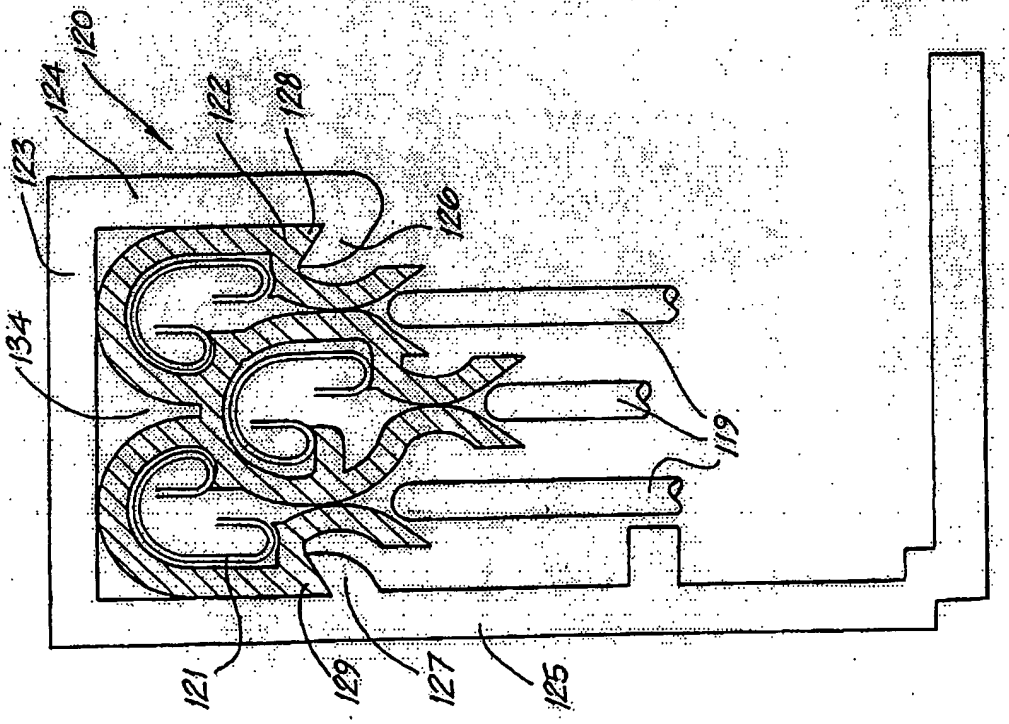

FIG. 11

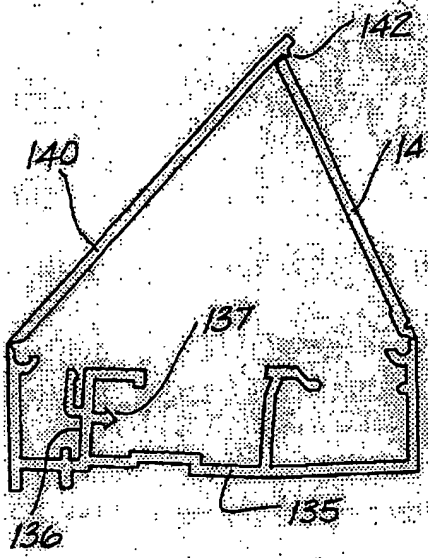

FIG. 18

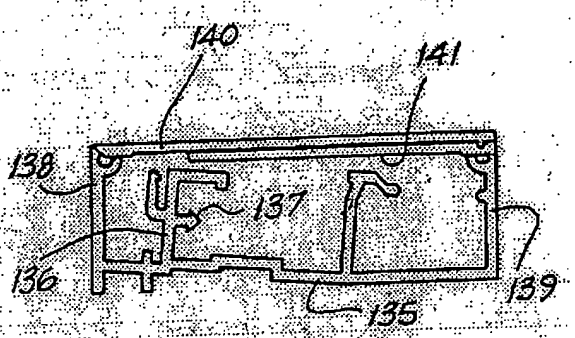

FIG. 19

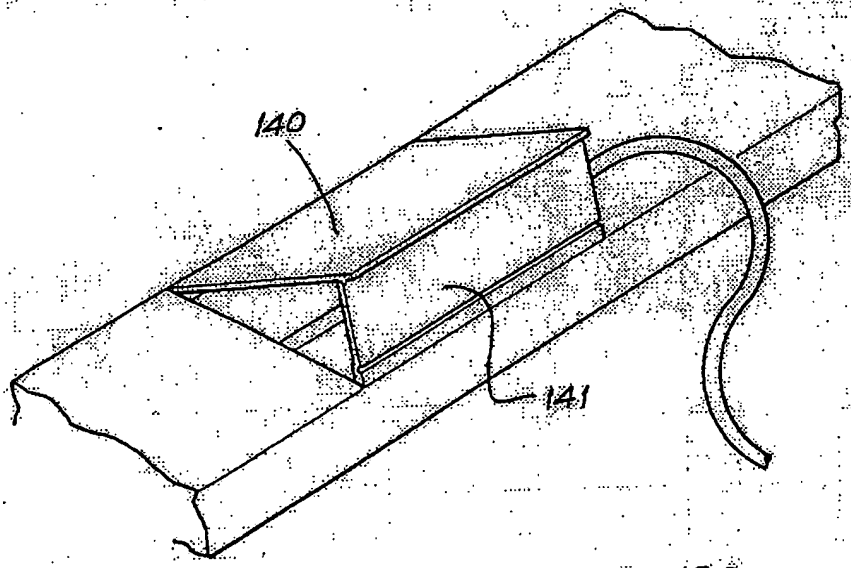

FIG. 20

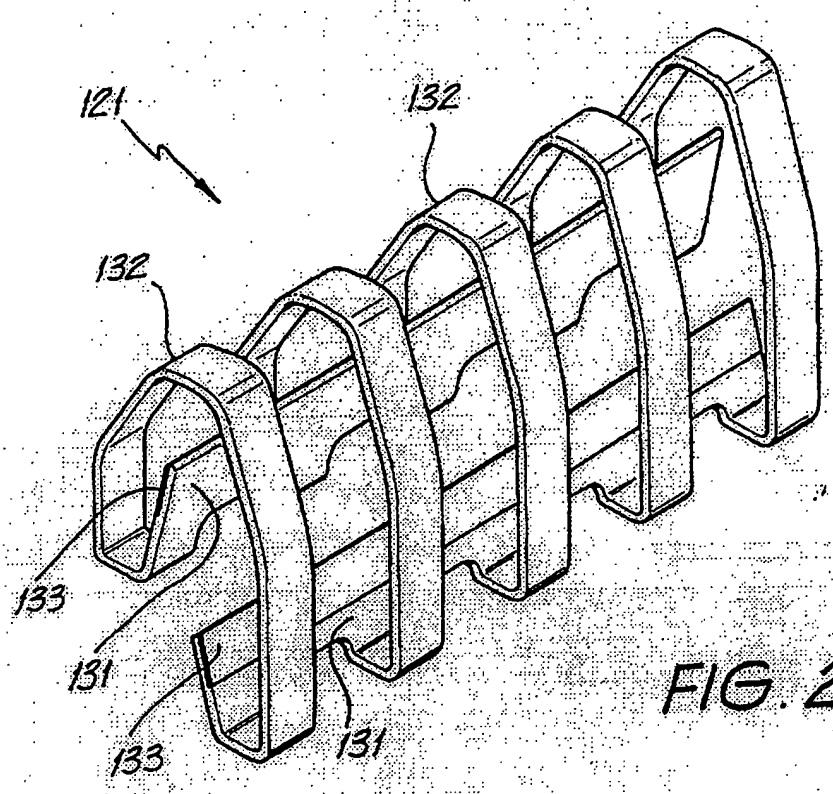

FIG. 21

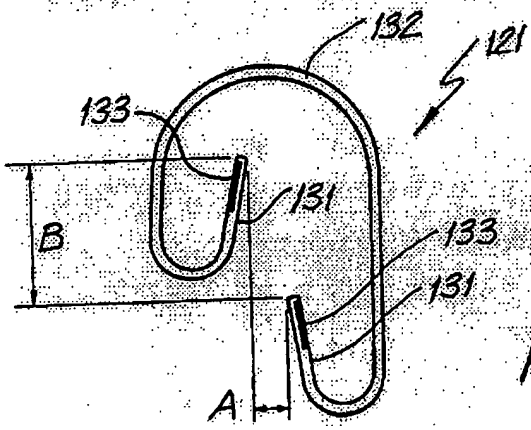

FIG. 22

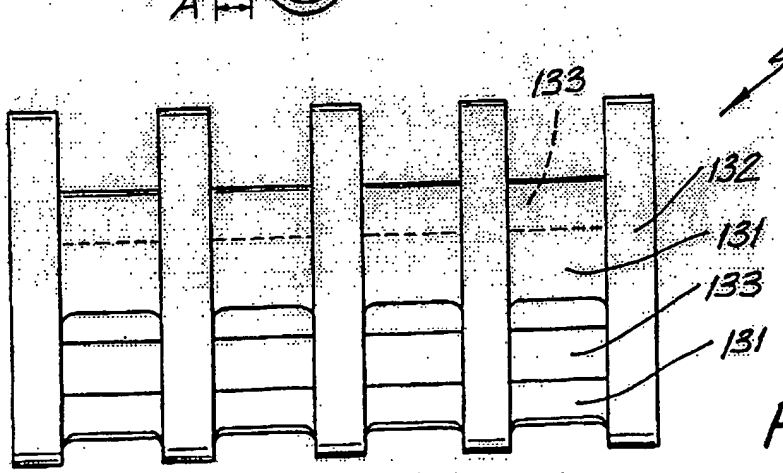

FIG. 23

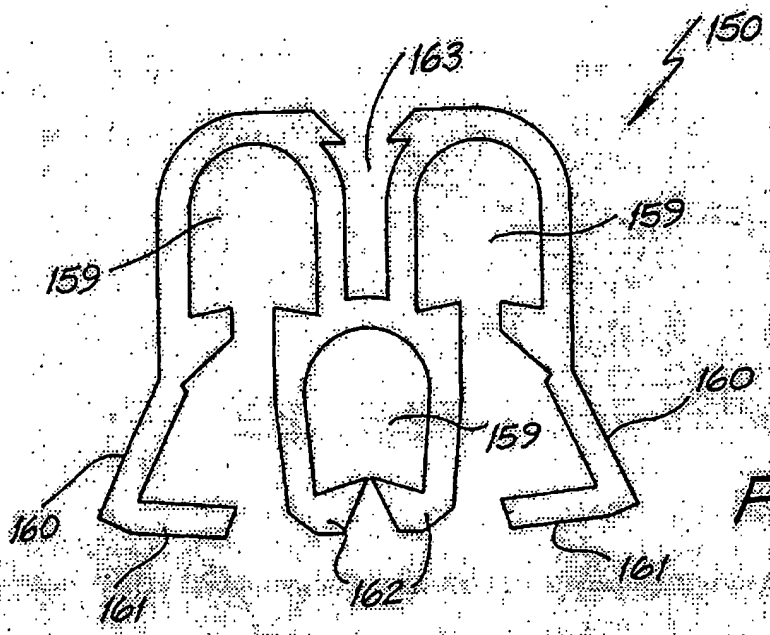
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FIG. 24

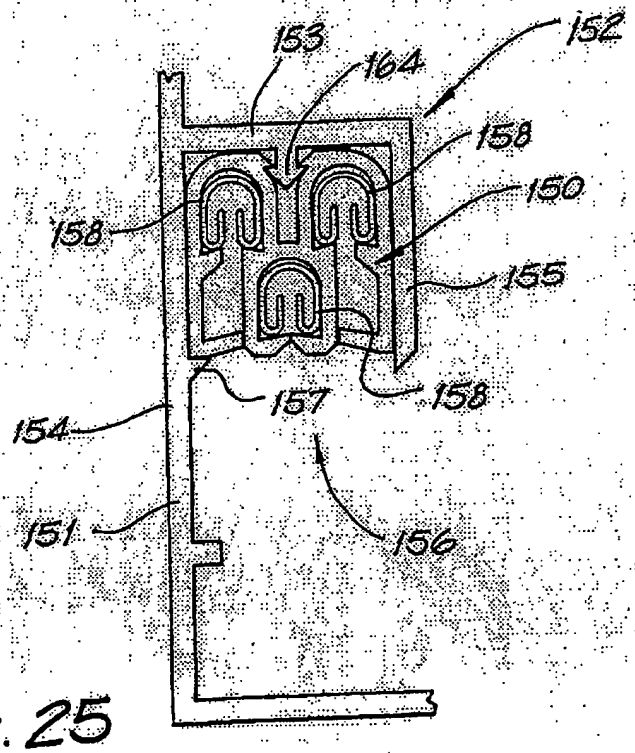
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FIG. 25

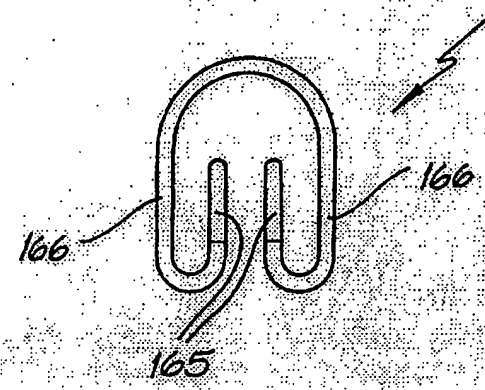

FIG. 26

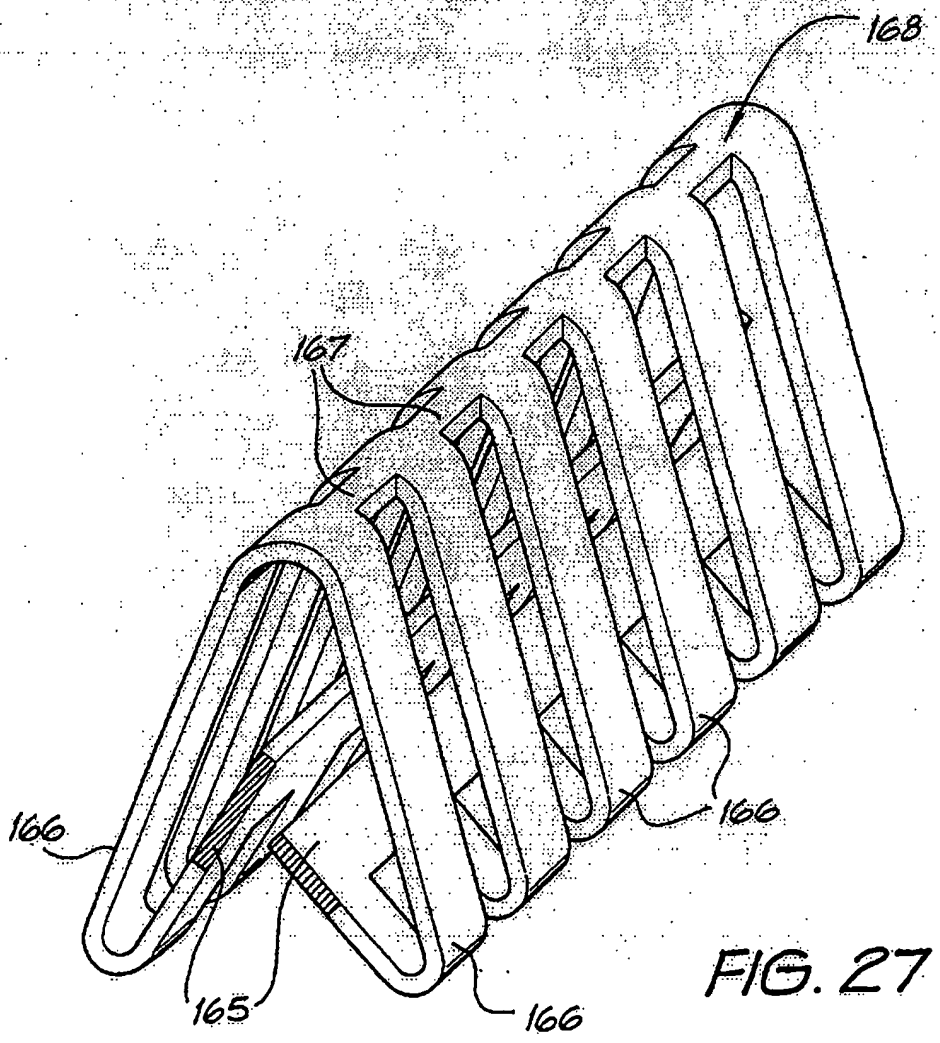

FIG. 27

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/AU 95/00675

A. CLASSIFICATION OF SUBJECT MATTER

Int Cl[6]: H01R 25/14, H02G 5/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC H01R 25/14, H02G 5/04, H01R 25/00, H01B 5/00, 5/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
AU: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	93/03517 WO, A, (MASS INTERNATIONAL PTY LTD), 18 February 1993 (18.02.93) page 10 lines 6-9, lines 16-22 page 8 lines 29-34, page 9 lines 34,35 page 11 lines 4-8, lines 36,37, figures 11,4,	1-5
A	1508788 GB, A, (PITCRAFT LTD), 26 April 1978 (26.04.78) page 2 line 130 - page 3 line 13, figure 1	4,5

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
18 January 1996	23.01.96
Name and mailing address of the ISA/AU AUSTRALIAN INDUSTRIAL PROPERTY ORGANISATION PO BOX 200 WODEN ACT 2606 AUSTRALIA Facsimile No.: (06) 285 3929	Authorized officer MANO RAMACHANDRAN Telephone No.: (06) 283 2166

Form PCT/ISA/210 (continuation of first sheet(2)) (July 1992) coplfm

PCT/INTERNATIONAL SEARCH REPORT

International Application No.
PCT/AU 95/00675

C (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	3030449 DE A, (DAIMLER-BENZ AG), 11 March 1982 (11.03.82), entire document	4,5
P, A	5399094 US, A, (KORTH et al), 21 March 1995, (21.03.95) entire document	4,5
A	93/19506 WO, A, (TORE SORENSEN ELEKTRONIKK AS), 30 September 1993 (30.09.93) Abstract, figures 1, 4	4,5
A	1597415 GB, A, (REHAU PLASTIKS AG & CO) 9 September 1981 (09.09.81) page 2, lines 85-115, figures 1,2	4,5
A	Derwent Abstract Accession No. 92-192856/24, Class X 12, 297732 DD, A, (ELPRO BERLIN AG) 16 January 1992 (16.01.92) abstract	1

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/AU 95/00675

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. Claims 1-5 and 13: An elongated flexible electric conductor

2. Claims 6-12 and 14: An elongated housing or insulating member having a longitudinally extending slot and a displaceable cover (continued on extra sheet)

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1-5 & 13

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/AU 95/00675

Box II continued

The international application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked to form a single inventive concept.
In coming to this conclusion the International Searching Authority has found that there are two inventions:

1. Claims 1-5 and 13 are directed to the features of an elongated flexible electric conductor comprising two longitudinally extending edge strips and a plurality of resiliently deformable transverse rib elements extending between the strips, said elements being located at spaced locations along the conductor.

2 Claims 6-12 and 14 are directed to the features of an elongated housing insulating member having a longitudinally extending slot to receive an electric conductor and a displaceable cover to provide access to the conductor.

Since the above two groups of claims do not share either of the technical features identified above, a 'technical relationship' between the inventions as defined in PCT rule 13.2 does not exist. Accordingly the international application does not relate to one invention or to a single inventive concept.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International Application No.
PCT/AU 95/00675

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
WO	93 03517	AU	24215/92	AU	655069	BR	9206402
		EP	597980	FI	940518	HU	67892
		JP	6511345				
GB	1508788						
DE	3030449						
US	5399094	DE	4308735	FR	2702893	IT	94730148
GB	1597415	DE	2730929	FR	2397083	NL	7801412
WO	93 19506	AU	37699/93	FI	944349	NO	921101
DD	297732						

END OF ANNEX